CASE STUDY: FAILURE TO STOP AT STOP SIGN
A Progressive Approach

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Pierce County, Washington is responsible for slightly over 1,500 miles of County public roads in the Tacoma/Puget Sound area approximately 30+ miles south of Seattle. Typical intersecting roadways within the County's system range from heavily traveled signalized multi-lane suburban arterials in excess of 40,000 vehicles per day to lower volume two-lane rural roadways having speed limits of 35 mph or greater.

The County regularly conducts intersection traffic safety studies based on reported collision history, citizen concerns, and operational observations. An outline of the study approach is summarized in Attachment 1. Central to this documented analysis is the review of each collision report involving the subject location, including reading the reporting officer's narrative description that was prepared from officer observations and interviews with the drivers, passengers, and any witnesses. From this review, any trends that may be present regarding collision type, causation, contributing circumstances, etc. are identified. If a common trend or tendency is determined, then possible countermeasures to address that specific trend can then be developed.

An increasingly more common trend being found in these traffic safety studies has been incidences of drivers failing to stop at Stop signs that clearly have adequate visibility. Where such a trend is identified, the County implements a progressive approach involving signing, markings, beacons in the following manner:

Existing condition: Stop sign with adequate visibility with trend of drivers failing to stop. Typical location is usually at a four-legged, two-way stop intersection.

Progressive approach: Implement countermeasure as described in Step 1. If failure-to-stop trend continues, then implement countermeasure in Step 2, and so on to additional steps if necessary.

1st Step: Install Stop Ahead sign.

2nd Step: Increase size of Stop and Stop Ahead signs from 30-inch to 36-inch.

3rd Step: Install two transverse rumble button patterns in the approach lane, in advance of the Stop Ahead sign and in advance of the Stop sign.

4th Step: Consider installation of two additional transverse rumble button patterns to supplement the first two rumble button locations.

5th Step: Install overhead intersection flashing red beacon with illumination; consider also installing flashing yellow indications on intersecting through road.

This progressive approach has been effective in identifying the appropriate level of traffic control devices needed in adequately addressing the failure-to-stop concern on a case-by-case basis. At the same time, it provides consistency in addressing this concern at various locations throughout the County road system in a similar way.

Other agencies by policy could consider other measures that are supported by their local practices and their maintenance & operations capabilities, such as perhaps using 48-inch signs, or changing to more retroreflective sheeting, or installing beacons on the sign structures themselves, etc.

The described approach has an almost exclusive dependence on addressing the accident concern solely through traffic engineering solutions. Lacking is possible involvement by enforcement (such as in addressing excessive speeds), or in education (e.g., driver inattention), or arguably in research (e.g., driver behavior). Although collision analysis at the local level can identify trends such as failure-to-stop, the practitioner often does not have supporting rationale or information that would help identify or predict causation for such a trend. In other words, the practitioner may know that there is a trend of drivers failing to stop at a Stop sign, but often lacks adequate basis or information to know why drivers could be reacting in this manner at the subject location. Why do drivers run Stop signs that have hundreds of feet of adequate visibility, or even Stop signs that are accompanied in advance with Stop Ahead signs? Are there contributing factors or visual queues or an effect of upstream traffic conditions that influence this behavior?

As other examples, the need for additional research could extend into the issues of:

- The effect or relationship of substandard entering sight distance to collision occurrence.

- Why drivers sometimes confuse some two-way stops as all-way stops. Are there visual queues that lead them this? Are there visual queues that can be implemented to lessen confusion? What are effective applications of using the "Cross-Traffic Does Not Stop" sign?

- Addressing driver inattention, often cited as a primary contributing factor to collision occurrences.

- The effect of excessive speeds on intersection safety; roadway factors that influence increased speeds; effect of enforcement alternatives on safety.

- The effectiveness of flashing beacons, such as those mounted on Stop sign structures, or Stop Ahead signs, or with overhead intersection beacons; flashing red beacons activated by approaching cross-street through traffic; or flashing yellow warning beacons on the through road activated by side-street traffic.

Attachment 1

AN APPROACH FOR CONDUCTING ENGINEERING SAFETY EVAULUATIONS OF INTERSECTIONS

Identify potential locations for evaluation and study through:
- Compile & monitor collision data
- Conduct regular routine traffic counts
- Perform operational observations
- Investigate citizen concerns

Conduct field review of selected locations
- Note existing signing, marking, geometrics, lane configuration
- Intersection sight distances
- Sign visibility
- Traffic counts, turning movements
- Vehicle speeds
- Pedestrian & bicyclist considerations
- Presence of any skid marks, glass, fixed objects hit

Document through preparation of written traffic study
- Description of existing conditions
- Review of data collected from field review
- Summary of collision analysis
- Warrant analyses,
  such as for signalization, all-way stop control, need for left turn lanes, etc.
- Projected conditions or other special considerations noted

Develop possible countermeasures
- Short-term: Adding or changing signing, striping, markings, illumination, Brushing, etc.
- Longer-range: Recommendations for capital improvement project, such as signalization, construction of left turn lanes, channelization, embankment removal or reshaping, realigning vertical or horizontal curves, etc.

Implement recommended countermeasures
- Short-term: Lower cost signing, striping, marking changes; brushing; etc through agency maintenance forces.
- Longer-range: Capital improvements; agency priority arrays; grant applications; public/private partnerships to leverage agency funds

Monitor
- Compiling & monitoring collision data
- Conducting regular routine traffic counts
- Performing operational observations
- Investigating citizen concerns